



APPENDIX D
Powerlink Asset Management Strategy
May 2011

Asset Management Strategy

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1 INTRODUCTION

1.1 Purpose

Powerlink Queensland is a Transmission Network Service Provider (TNSP) in the Australian National Electricity Market (NEM) that owns, develops, operates and maintains Queensland's high voltage electricity transmission network.

As a TNSP, Powerlink has specific mandatory obligations under its Transmission Authority, the National Electricity Rules and the Electricity Act 1994 (Qld). In addition Powerlink is also committed to meeting the needs of its shareholders, grid customers, NEM participants, employees and the broader community.

The Queensland Government has also appointed Powerlink as the Jurisdictional Planning Body for Queensland to assess the capability of the State's transmission network to meet forecast electricity load growth, in accordance with the mandated reliability standards for electricity transmission.

In order to effectively discharge these obligations, Powerlink has implemented a series of strategies to manage the development, operation and maintenance of its high voltage network assets and digital technologies.

This Asset Management Strategy discusses the key business drivers and risks for delivery of transmission services by Powerlink and sets out the strategic framework for asset management in Powerlink.

1.2 Asset Management Overview

The role of Powerlink's asset management system is to ensure the organisation's assets are managed in a manner consistent with the Asset Management Policy and its overall corporate objectives to deliver effective and efficient transmission services.

ASSET MANAGEMENT STRATEGY

The key elements of the system can be summarised in Figure 1 below:

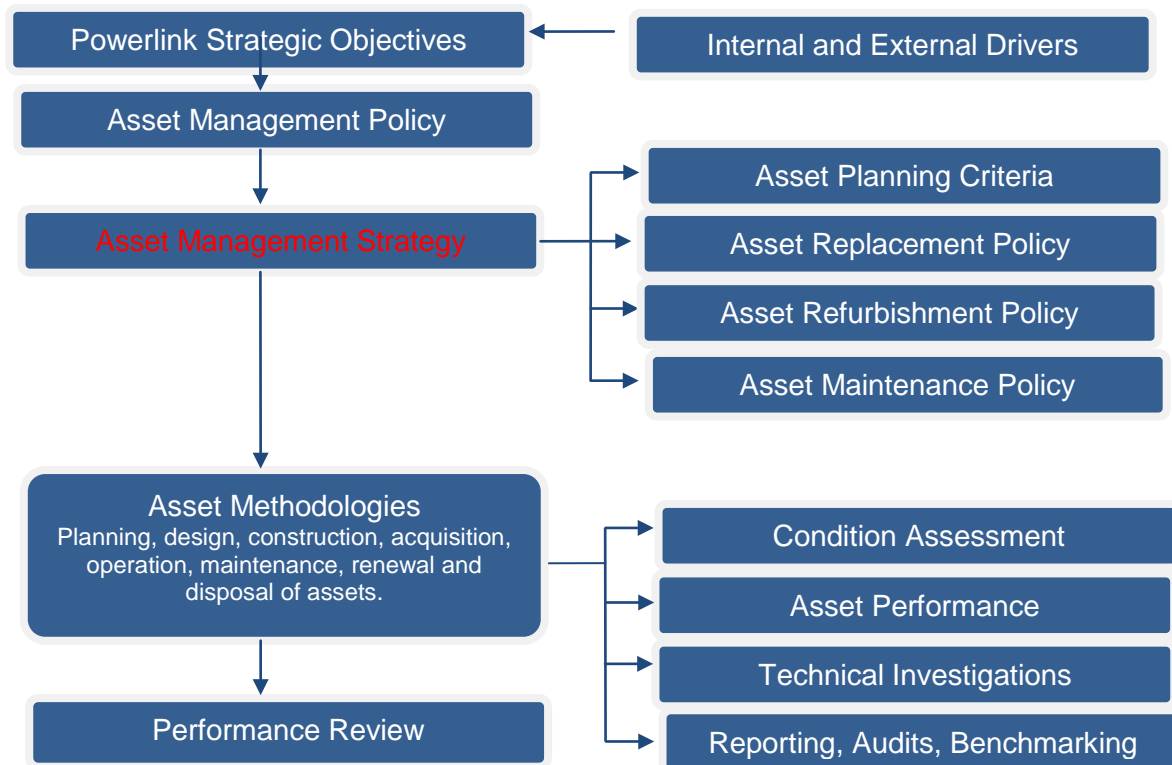


Figure 1 Asset Management System

The Asset Management Strategy considers a range of matters, including:

- statutory, economic and community obligations that drive the performance of our business and the network
- asset profile of Powerlink's network
- life cycle of an asset
- asset related risks and liabilities
- principal strategies associated with Powerlink's management of plant and asset
- efficient allocation of resources
- mechanisms to monitor performance and achieve continuous improvement in the management of plant and assets over time.

A performance review is undertaken routinely as part of an environment for continuous improvement. Areas with particular focus are the operation of Powerlink's assets, efficient and prudent expenditure in the creation of new assets, and the efficient operation and maintenance of existing assets. The ongoing refinement of the strategy is in itself a continual improvement process.

1.3 Asset Life Cycle

A critical element of asset management is to consider the life cycle of assets. This deals with three primary timeframes in the life of an asset and the interaction of these phases on each other. Powerlink’s practices consider the whole life cycle of the asset in its decision making processes.

The three primary timeframes are as follows:

- (i) **Planning and Investment** – deciding when new assets are needed, what assets are appropriate and economic to meet that need and what form those assets should take given the later stages of the asset life cycle.
- (ii) **Operation, Maintenance and Refurbishment** – ensuring each asset remains fit for purpose over its life (sometimes as long as 50 years), including appropriate operating and maintenance strategies, refurbishment and ongoing assessment of the condition of the assets.
- (iii) **End of Life** – considering an asset’s ongoing fitness for purpose and whether an asset should be disposed of or replaced. Any replacement decision needs to also consider the requirements associated with planning and investment to ensure optimal economic outcomes.

These timeframes and the interaction between them over the life cycle of assets are shown in Figure 2. Due to the progressive nature inherent in the development of a transmission system, assets of various types exist in all phases of the asset life cycle at all times. This results in some particular challenges that need to be considered in the asset management practices.

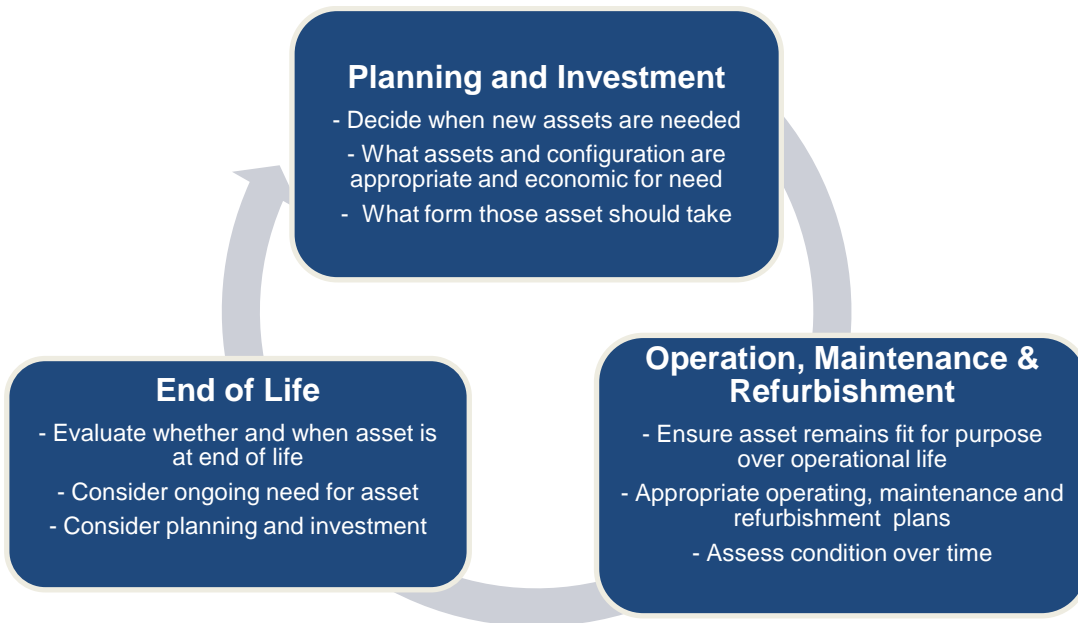


Figure 2 Asset Life Cycle

1.4 Asset Management Cycle

In addition to considering the Asset Life Cycle, good asset management practices also need to consider the broader business environment in which it is operating and overarching business requirements such as safety and environmental management. Powerlink manages these aspects by also considering an Asset Management Cycle which is essentially a continuous improvement cycle taking into account evolving factors from both the internal and external environments. This cycle is shown in Figure 3.

ASSET MANAGEMENT STRATEGY

- (1) The Asset Management Cycle starts with **Strategic Alignment** that involves defining obligations and ascertaining the expectations of stakeholders.
- (2) The next step in the cycle involves determining how Powerlink is going to respond to those obligations and expectations and developing risk based **Asset Management Strategies** to meet or manage those obligations and expectations depending on the nature of them. The Asset Life Cycle is particularly important in determining the manner in which Powerlink will meet or manage these obligations and expectations.
- (3) The third step in the cycle involves **Resource Alignment** to agreed Asset Management Strategies. Effective Asset Management requires consideration of the resources needed to implement each strategy, and reconciliation of the priority of each strategy with the cost and availability of the various types of resources required for their implementation.
- (4) The first three steps should ensure that the strategies adopted are consistent with Powerlink's obligations and expectations and are able to be effectively and efficiently resourced. However, it is also appropriate to monitor whether this is occurring through **Continuous Review** so that any necessary adjustments can be made around the first three steps through the identification and adoption of improvement opportunities.

Adopting this process continuously in the application of Asset Management practices within Powerlink ensures that Powerlink consciously determines action plans to be adopted over various timeframes and understands the extent to which those actions will result in meeting those obligations and expectations.



Figure 3 Asset Management Cycle

1.5 Levels of Service

In terms of managing the development and ongoing operation of the high voltage transmission network, Powerlink has a number of service levels derived from our strategic drivers, statutory authorities and our transmission licence and associated operating obligations, which are considered below.

Network Investment

- Meet mandated reliability of supply obligations in Powerlink's Transmission Authority.
- Plan network development in accordance with the transmission authority, the Electricity Act and the NEM Rules
- Meet the needs of our customers
- Support the efficient operation of the NEM through consideration of investments that deliver net market benefits
- Ensure reliability and quality of supply
- Ensure plant is replaced in an orderly manner to maintain reliable supply to consumers
- Maintain and upgrade security as necessary to appropriate levels for critical infrastructure

Network Operation & Maintenance

- Maintain plant to provide safe, reliable electricity supply
- Minimise the risk of and actual loss of supply events
- Conform with National Electricity Rules
- Conform with the requirements of our TNSP Operating Agreement with AEMO
- Monitor performance against the Service Targets Performance Incentive Scheme (STPIS)
- Meet the needs of our customers
- Meet the requirements of the Standard within the for Power Systems Data Communications Standard
- Withstand credible contingencies (N-1)

Market Participants & Customers

- Meet the terms of Connection and Access agreements
- Conform with the National Electricity Rules
- Maintain effective NEM participant and customer relationships

Environment

- Have no reportable environmental incidents
- Comply with environmental, planning and cultural heritage legislation, translated into Powerlink's Environmental Strategy/Management Plans
- Maintain an Environmental Management System with regular reporting to the Environmental Steering Committee

Safety

- Powerlink's target with respect to safety is for zero accidents, and integration of safe working practices in all Powerlink activities
- Comply with the Electrical Safety Act, associated regulations & Procedures for Safe Access to HV Electrical Apparatus High Voltage Isolation and Access requirements
- Comply with Workplace Health and Safety Act and requirements
- Comply with all workplace, health and safety legislation, translated into Powerlink's Safety Management Plans
- Maintain a Safety Management System with regular reporting to the Safety Steering Committee

1.6 Asset Profile

As of 30 June 2010 the network consisted of the following major sites and items of primary equipment.

Table 1 Substations / Switching Stations

Voltage	Substations	Cable Transition	Communication Sites
330kV	4	0	
275kV	35	2	
132kV	58	0	
110kV	15	1	
TOTAL	112	3	91

Table 2 Transformers

Voltage	Transformer (Three Phase)
330kV	5
275kV	70
132kV	85
110kV	27
TOTAL	187

Table 3 Circuit Breakers

Voltage	Total Number
330kV	28
275kV	412
132kV	427
110kV	263
66kV	27
TOTAL	1,157

Table 4 Capacitor Banks, Shunt Reactors and Static VAR Compensators

Voltage	Capacitor Banks	Shunt Reactors	Static VAR Compensators
330kV	0	4	0
275kV	26	15	8
132kV	25	0	11
110kV	34	0	0
66kV	7	5	0
TOTAL	92	24	19

Table 5 Transmission Lines

Voltage	Route - km	Circuit - km
330kV	347	691
275kV	5,819	8,037
132kV	2,769	4,405
110kV	238	416
66kV	1	1
TOTAL	9,174	13,550

ASSET MANAGEMENT STRATEGY

Table 6 Underground Cables

Voltage	Route - km	Circuit - km
330kV	4	9
275kV	1	2
110kV	3	7
66kV	1	1
TOTAL	9	19

Powerlink maintains a detailed computer based asset information system (currently SAP) that among other things permits:

- unique identification of plant and equipment that in combination forms part of the overall asset base
- management of asset value and depreciation
- categorisation of assets into appropriate technical classes
- profiling of asset age, condition, defects and performance
- recording of the relevant physical characteristics of the asset (e.g. Plant ratings)
- management of work, resources and costs associated with assets
- management of materials, inventory and spares associated with assets.

Through SAP, Powerlink also ensures that both technical and financial information is available and intrinsically linked, in order to allow ongoing monitoring and response to a range of issues including, but not limited to, optimisation of maintenance strategy and life cycle cost analysis.

1.7 Powerlink Business Model

Powerlink undertakes the management of its assets through implementation of an Asset Ownership/Asset Management/Service Provision business model (AO/AM/SP). Powerlink considers this business model and philosophy associated with it is an essential element in managing the complex, and sometimes conflicting, environment in which Powerlink provides its transmission services. Through this model an integrated and responsive management structure is provided, capable of reconciling complex issues through areas of expert knowledge coupled with collaboration to ensure all relevant information is available.

The Asset Management function consists of teams that drive strategies that support the full life cycle of Powerlink assets, from planning and asset investment, through operation and maintenance, to asset replacement and disposal. This affords a strong focus on optimisation of asset investment and other work by achieving a balance between factors such as investment cost, safety, environment, stakeholder expectations, and the reliability, maintainability and supportability of the assets over their life.

A powerful aspect of Powerlink's Asset Management philosophy is the tight integration between the development of strategies and the initiation and oversight of work to support those strategies. The business unit responsible for Asset Management consists of teams responsible for initiation, approval and sponsorship of all capital investment, maintenance and refurbishment work. This helps ensure the efficient implementation of projects and work with the appropriate overall priorities and provides a feedback loop between strategy and implementation phases.

The segregation of the internal purchase of goods and services by the Asset Management group from the provision of those services, both internally and externally, provides increased accountability and contestability (where appropriate).

1.8 Powerlink Structure

Powerlink is structured into Business Units around delivery of network services and corporate strategies and needs. All Business Units involved in the delivery of network services report to the Chief Operating Officer facilitating greater focus and co-operation between the parts of the business involved in network service delivery matters.

The corporate structure is shown in Figure 4.

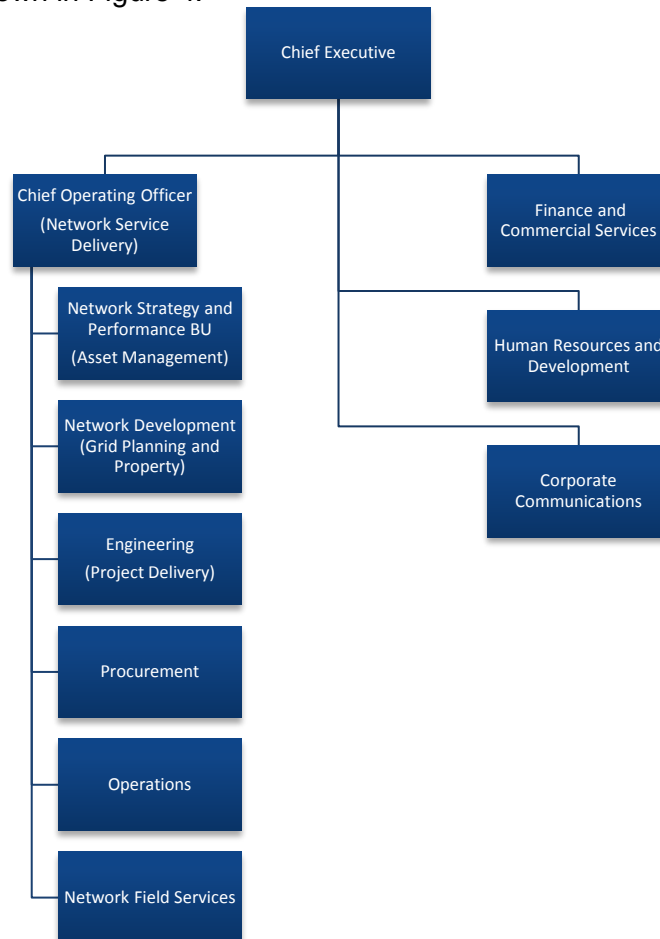


Figure 4 Powerlink Corporate Structure

1.9 Safety Strategy

Safety is an intrinsic component of working at Powerlink and is a top priority for Powerlink employees. Powerlink drives safety improvements and initiatives through a Safety Steering Committee, and a safety compliance framework that consists of centrally stored policies, procedures and incident reporting systems.

Powerlink Queensland endeavours to ensure that all activities are conducted so as to be free from accidents and incidents, whilst providing customers with services that satisfy their needs. To achieve this Powerlink has adopted a proactive approach to the management of Workplace Health and Safety and Electrical Safety.

Strategies used include:

- complying with relevant Workplace Health and Safety and Electrical Safety Legislation and Standards, including use of an audit regime to monitor compliance with WH&S and electrical safety legislation, for specific projects, and routinely on the remainder of Powerlink's existing assets
- integrating Workplace Health and Safety responsibilities into all activities of all employees to promote ownership and control of their continual wellbeing

ASSET MANAGEMENT STRATEGY

- actively promoting the importance of safety, including adoption of safety as one of Powerlink's five workplace values
- openly consulting with employees and relevant stakeholders about all matters that may affect their health and safety
- providing training and support to enable its employees to perform their duties with a minimum of risk, regardless of their work location, whether local, interstate or overseas
- maintaining records and statistics to enable monitoring of performance and trends.

Powerlink's business carries with it inherent risks that must be carefully managed. Foremost are Powerlink's obligations with regard to Workplace Health and Safety and Electrical Safety. Changes occur frequently in this area, which requires Powerlink to be particularly vigilant of the legislation and also the design, maintenance and operation practices of our personnel. Powerlink has also implemented specialised live line and substation work practices that must be carefully planned, implemented and monitored.

More generally, Powerlink operates a high voltage transmission network spanning an extremely large geographical area. The nature of our business requires increased focus on the ongoing safety of our staff, particularly with regard to managing the risks of remote working and fatigue.

1.10 Environment Strategy

Powerlink has implemented an environmental management system that includes policies, procedures, training and auditing to ensure that Powerlink employees are aware of their obligations with respect to the environment and that Powerlink's obligations are appropriately managed through the contracting arrangements that Powerlink uses to deliver transmission services.

This Asset Management Strategy supports responsible environmental management as an integral part of our business activities. That commitment is demonstrated by:

- consulting openly, honestly and proactively with the community and statutory authorities on the potential environmental impacts of our plans and activities. Powerlink is responsive to constructive suggestions to eliminate or minimise potentially adverse impacts
- incorporating environmental factors such as land use, noise and visual impact, protection of flora and fauna, pollution prevention and waste management into the fundamental business processes and procedures
- maintaining a structured approach to managing our environmental aspects through an Environmental Management System
- seeking continual improvement in the environmental performance of our operations
- complying with relevant environmental legislation
- building and encouraging ownership of environmental care among our people by providing training and support.

In addition, all of Powerlink's major construction activities are undertaken in accordance with specific Environmental Management Plans (EMPs), to effectively manage the impacts of construction activities.

Powerlink aims to have no reportable environmental incidents from its operations and expects staff and contractors to comply with all EMPs associated with particular assets. Monitoring of compliance with EMP conditions occurs for all major construction projects through regular auditing of specific projects, as well as audits which are concerned with Powerlink's operations more generally.

2 STRATEGIC ALIGNMENT

The first step in the Asset Management Cycle involves an assessment of Powerlink's obligations across a wide range of legislation and market requirements and ascertaining the expectations of relevant stakeholders.

2.1 Statutory Requirements

As a Queensland-based Transmission Network Service Provider (TNSP) operating in the National Electricity Market (NEM), Powerlink is required to meet a number of statutory obligations at both the national and state level. The most significant of these obligations can be summarised as follows:

- Provision of safe, reliable and cost effective transmission services to users of the grid in accordance with the National Electricity Rules and its Transmission Authority.
- Compliance with all relevant State and Federal environmental, planning and cultural heritage legislation.
- Compliance with all statutory workplace health and safety requirements including the Electricity Safety Act and the Workplace Health and Safety Act and Regulations.
- Performing the role of Jurisdictional Planning Body for Queensland.

2.2 Shareholders

Powerlink's Asset Management practices should contribute to a fair and reasonable return on asset value to its shareholders. While Powerlink is a Government Owned Corporation with its own independent Board, Powerlink is also aware that its shareholders expect it to continually drive for improved reliability and quality of supply at the lowest long term cost to electricity consumers. Minimising investment risk is also expected and is achieved through identification of efficient and prudent investments and compliance with the regulatory frameworks under which Powerlink provides its services.

As a Government Owned Corporation, Powerlink is also required to comply with a number of the initiatives and requirements of the Queensland Government and to maintain its reputation as a good corporate citizen.

The annual Statement of Corporate Intent is the formal performance agreement between the Board of Directors of Powerlink and its shareholding Ministers with respect to the financial and non financial performance targets for the relevant financial year.

2.3 Community and Electricity Consumers

Powerlink is aware that electricity supply is effectively an essential service which community members rely on heavily. As such community and customer expectations also drive for improved reliability and quality of supply at the lowest long term cost to electricity consumers. This is particularly relevant in situations of natural disasters which are prevalent in the Queensland operating environment as the availability of electricity supply is an essential element in the ability of communities to rebuild. This requires Powerlink to not only consider the reliability of supply in meeting demand but also the resilience of its network to natural disasters and risk mitigation mechanisms against multiple contingencies to return and maintain some electricity supply as quickly as possible following natural disasters.

Powerlink is also aware that its infrastructure is linear in nature and that it has many community members as 'neighbours' with its infrastructure being located on an easement. Maintenance of good community relations requires the organisation to be aware of its obligations and expectations, to ensure it is operating safely and appropriately and to treat landowners respectfully in its ongoing dealings over the life of the relevant assets. Powerlink therefore aims to communicate its intentions in

ASSET MANAGEMENT STRATEGY

a clear and transparent manner when building new transmission infrastructure or working on existing assets. Powerlink also takes a responsible approach to the management of land and broader environment in undertaking its activities.

2.4 Market Participants

Participants in the NEM place a high reliance on the ability of the transmission networks to facilitate successful operation of the electricity market. Powerlink has obligations under the National Electricity Rules regarding the provision and operation of its network to provide safe, reliable and cost effective transmission services to the NEM participants. There are also expectations that Powerlink will seek to maximise the operational capability of its network that is made available to the NEM, mitigate or reduce the impact of planned and forced outages on the NEM and engage NEM participants to balance the impacts on Powerlink against the broader impacts on the market.

Powerlink is also required to provide open access to its transmission network under the National Electricity Rules and conform with the terms and conditions of Connection and Access Agreements with network users.

2.5 Employees

First and foremost Powerlink seeks to provide a safe working environment for its employees.

Powerlink also seeks to provide its employees with opportunities for development and to perform value add work along with management of work life balance in its employment.

3 ASSET MANAGEMENT STRATEGIES

The second step in the Asset Management Cycle considers the obligations and expectations identified under the strategic alignment phase and determines how Powerlink is going to respond in meeting or managing those obligations and expectations.

In meeting or managing these obligations and expectations, Powerlink must manage its assets in accordance with “good electricity industry practice” - ensuring all Asset Management processes meet the relevant Australian/International Standards. In the absence of such standards, practices must be consistent with modern industry standards and practices.

There are a number of strategies and positions which Powerlink has which are relevant to the development of Powerlink responses to its obligations and expectations.

3.1 Powerlink’s Mission, Vision and Values**Mission**

Powerlink Queensland is committed to delivering transmission network and related services at world class levels of safety, reliability and cost-effectiveness

Vision

To be the leading transmission network service provider in Australia and one of the best in the world.

Values

- Reasonable returns for the owners.
- Value for money services to our customers.
- The wellbeing of our employees.
- Being a good corporate citizen and community recognition of this.
- Fair, commercial and courteous dealings with our suppliers.

In fulfilling these strategic objectives Powerlink must also ensure its assets are managed in a manner that meets its statutory obligations, while considering best industry practice, shareholder requirements and community expectations.

3.2 Powerlink's Corporate Strategies

Powerlink has a number of corporate strategies with which the Asset Management strategies must align. The corporate strategies are reviewed annually to ensure they align with stakeholder needs and Powerlink obligations.

Develop the Networks We Own and Manage

- Develop the Queensland transmission grid to cost effectively meet customer needs, including regulated, negotiated and non-regulated investments.

Achieve Operational Excellence

- Safety - provide a safe environment for employees and the public.
- Environment - demonstrate regard for the environment by complying with all relevant legislation.
- Cost-efficiency - be the most cost effective transmission business in the NEM, and achieve improved results across the whole business each year.
- Network performance - exceed the service standards.

Grow non-regulated profits

- Selectively grow non-regulated business by leveraging core competencies where Powerlink has a sustainable competitive advantage.

3.3 Powerlink's Workplace Values

Powerlink has established a Powerlink way of working. These are values associated with how we do work at Powerlink and the way in which each person working at Powerlink is striving to achieve Powerlink's overall goals. The Powerlink way of working is as follows:

Safe

Safety is the priority in everything we do and is everyone's responsibility.

Cooperative

We will at all times work cooperatively with others in Powerlink, share information, resources, support organisational goals and changes, help others, and keep the commitments we make to others. We will work to resolve conflicts constructively through communication and discussion.

Respectful

We will show courtesy and respect towards others at all times. We will seek first to understand other people's points of view, and listen to what they are saying, and then to be understood. We will be fair, considerate and equitable. We will acknowledge the efforts of others.

Ethical

Everyone will at all times behave honestly, ethically, professionally, conscientiously, responsibly and in a way that complies with policies, procedures and legislation. To the extent that we are entrusted with confidential information, we will preserve that confidentiality.

Proactive

Powerlink people are willing to take the initiative, have a "can do" but realistic attitude to work, are open to new ideas and improvements, and are prepared to take considered risks. When things go wrong or there is a problem, we focus on fixing the issue. We take responsibility for our actions and decisions.

3.4 Asset Management Activities

Powerlink's Asset Management activities can be considered in line with the three key stages in the asset lifecycle. For each stage the corresponding strategic objectives, levels of service and process for achieving the strategic objectives is outlined.

Planning and Investment (Network Augmentation, Easements and Connections)

- Load Driven (Prescribed Services)
- Third Party Request (Non-Prescribed)

Operation, Maintenance and Refurbishment

- Network Operations - System Operating Parameters, Outage Management
- Corporate Emergency and Security - Corporate Emergency Response, Asset Security
- Maintenance and Refurbishment - Preventative & Corrective Maintenance, Refurbishment, Insurance Spares and Asset Monitoring

End of Life (Asset Replacement and Disposal)

- Non-Load Driven (Risk Assessed Investment)
- Disposal

3.5 Planning and Investment

Powerlink takes an integrated and coordinated approach to the process of investing in **new** assets. Capital investment in new assets is classed as either network projects (the infrastructure that supports the high voltage transmission network) or non-network projects (that involve capital investments for business support and information technology).

Shared network augmentations, easements & connections must:

- Meet requirements of Transmission Authority and National Electricity Rules
- Meet the needs of our customers jointly with DNSPs
- Support the efficient operation of the NEM, including assessing market benefits of augmentation
- Ensure reliability and quality of supply
- Meet the needs of our customers
- Withstand credible contingencies

3.5.1 Load Driven – Prescribed Services

Investments in network assets are triggered from load or non-load drivers, with load-driven projects involving shared network augmentations, connections between the transmission and distribution networks or land/easement acquisition.

While Powerlink uses a scenario based outlook in the medium term horizon, the need for network augmentation at the point of investment is well defined. Powerlink's obligations under its Transmission Authority, Electricity Act and the National Electricity Rules, coupled with strong community expectations for reliable electricity supply, create an imperative for Powerlink to meet the growing need for electricity supply via transmission or non-transmission solutions. Due to legislative obligations to meet the standards of service these are considered as prescribed services.

Augmentation

Powerlink's future planning and capital forecasting process for investments driven by load growth recognises the inherent uncertainty of the Queensland electricity market's transmission requirements by utilising a scenario based approach. In broad terms, Powerlink considers that future network development must:

- meet the required levels of reliability of supply to consumers in an efficient manner
- meet the needs of the market and support the efficient operation of electricity generation and supply system as a whole
- comply with licence conditions and planning criteria
- preserve options (including land access arrangements) which provide for future provision of infrastructure efficiently and comply with the state government requirements for future identification and planning of infrastructure
- take due consideration of environmental impacts and balance environmental and development needs in a manner acceptable to the community
- utilise technology and network architecture that serves to support an appropriate level of network availability and plant/equipment reliability

ASSET MANAGEMENT STRATEGY

- adopt standardisation of assets as appropriate.

To take account of the uncertainty inherent in demand forecasts and the even greater uncertainty in the location and size of future generation under the deregulated electricity market, Powerlink has adopted a comprehensive scenario based approach to grid planning to cover a wide range of alternatives for transmission system development. Inputs to this planning approach include the load forecasts and information available on possible generation developments, proposed power imports and other possible market developments.

At the point of each individual investment, however, the planning environment is not probabilistic, and exploration of feasible transmission and non-transmission options to meet a specific and well-understood need is undertaken.

During the investment decision-making process, Powerlink needs to ensure the investment is efficient and that the required processes are followed so that regulated revenue will be provided for the investment. In general, the following three basic steps should be followed while ensuring governance arrangements are followed throughout the project identification, selection and implementation:

- Ensure there is a clear or demonstrable need.
- Ensure that the right option to address the need is chosen via economic comparison of options and compliance with any NER obligations such as the Regulatory Investment Test – Transmission.
- Engage in effective project sponsorship to ensure efficient cost of implementation. The investment process involves definition of project deliverables to ensure that the criteria for the augmentation are well defined and commensurate with relevant network investment decision, equipment strategies, and configuration and design standards.

Details of the forecasting process are contained within **Powerlink's Planning Criteria** policy document.

Powerlink has a well established integrated process for network investment decision making and coordination that takes into account regulatory, customer, network planning, reliability and performance outcomes of the proposed investment.

In deciding what assets are required and the form that the assets should take, the following shall be considered:

- Statutory compliance obligations.
- Investment decision - life extension, replacement or decommissioning.
- Architecture and topology - equipment, configuration and design standards applied to substations, transmission lines and other systems.
- Asset life cycle factors - plant maintenance, reliability, maintainability and support.
- Community and environmental impacts.
- Revenue considerations.

Easements

In order to provide for the construction of new network assets, Powerlink must at times purchase property, extend existing easements or acquire new easements. Detailed planning for future land requirements is carried out in conjunction with knowledge of development occurring around the State, which might impact on the availability of suitable land or easements for the construction of transmission infrastructure.

Consideration of future development is also necessary to ensure infrastructure is available to meet supply obligations on Powerlink. The Queensland Government has an increased focus on infrastructure requirements and coordinated development. This is particularly so in the South East Queensland area where the SEQ Regional Infrastructure Plan has been developed to manage development activities and ensure infrastructure is planned well in advance (typically 20 – 25 years).

Such long term jurisdictional land use planning is a key driver for Powerlink to identify and secure easements and substation sites well in advance.

Powerlink coordinates easement and land requirements through an integrated easement strategy, which involves a regular assessment of land or easement requirements that may be triggered by existing or emerging needs of the transmission network. The easement strategy and the associated regular workshops are used to identify when acquisition processes need to be initiated as well as the need for communication strategies for communities in regions that are impacted by network development.

Powerlink's powers of easement acquisition can be exercised in accordance with Land Acquisition Act 1967 or the Land Act 1994 (Easement Acquisitions). To construct electricity infrastructure on easements or land Powerlink must comply with all relevant legislation, including the ministerial designation of the relevant land for community infrastructure under the Integrated Planning Act.

Powerlink must comply with a wide array of planning, environmental and cultural heritage legislation when seeking designation. Legislation that dictates these compliance issues is actively reviewed and registered within Powerlink's compliance systems.

3.5.2 Third Party Request – Non Prescribed

Provision of non-prescribed transmission services can be carried out on an opportunistic basis. Powerlink has a legal obligation to provide access to our transmission network to third parties who wish to connect. The provision of connection services could be contestable or it could be a combination of negotiable/negotiated and contestable services depending on the arrangement and the point of connection to the transmission network

3.6 Operation, Maintenance and Refurbishment

Powerlink's operating, maintenance and refurbishment process is driven by the need to maximise the availability of the assets over the long term as part of maintaining a reliable supply of electricity to consumers and facilitating the effective operation of the competitive electricity market. To this end Powerlink carefully balances each of these activities in conjunction with consideration of the life cycle of assets through a risk assessment process.

ASSET MANAGEMENT STRATEGY

Maintaining effective operating strategies is essential for ensuring Powerlink is able to:

- Operate the network within NER requirements
- Minimise impact of planned and forced network outages on NEM participants
- Engage in effective practices for fault management and restoration, through remote access and condition monitoring
- Ensure that the security management framework for Powerlink's assets is consistent with Guidelines for Protecting Critical Infrastructure Against Terrorism
- Conduct an annual program of emergency response exercises to make Powerlink ready and able to respond to network emergencies
- Ensure continuity of the transmission network and business through the implementation of disaster recovery facilities

Powerlink centralises coordination of operational strategies in order to develop a consistent framework for network and business operation and to ensure consolidated stakeholder management for AEMO, NEM participants and grid customers.

3.6.1 Network Operations

System Operating Parameters

In terms of system operating parameters, Powerlink maintains a range of strategies that ensure compliance with our three primary operating guidelines:

- Responsibilities under the TNSP Operating Agreement with AEMO
- National Electricity Rules – providing guidelines on high voltage network reliability, security, system operating parameters and network resiliency to outages.
- Power Systems Data Communications Standard – providing reliability and availability guidelines on data requirements for the operation of the transmission network

A centralised operations group implements system operating parameters through a range of functions described below:

- System setting coordination.
- Network support agreement management.
- Operating agreements with market participants.
- Network constraint equations.
- Network operating ratings.
- Assisting AEMO with network black start arrangements.
- Power quality.
- Operational contingency plans.

Powerlink has also established a range of systems including the Energy Management System, Power System Analysis suite, Psymetrix, Operations Guide and Power Operations Web that provide for system operational control and industry setting coordination, network constraint monitoring, network operating ratings & power quality analysis.

Outage Management

Outage management is pivotal in Powerlink achieving the following outcomes:

- Ensuring compliance with the National Electricity Rules.
- Effective work progress against the maintenance plan and capital works program.
- Achieving Operational excellence, by minimising outages for projects and maintenance, providing decision support for scheduling and managing outages and reducing system restoration time.

In keeping with these objectives, Powerlink has developed a range of systems for works and outage management that allow for the forward projection of future work requirements and the coordination and optimisation of outages on the transmission network. Long term outage plans are provided to AEMO in accordance with outage notification requirements.

Powerlink uses planning tools such as the PAWS, OSTRAC, Operations Guide and Power Operations Web to plan long term outage requirements and coordinate short term scheduling of outages on a day-to-day basis.

Significant changes in outage management and work coordination are anticipated with the introduction of improved computer-based decision making tools and the ongoing desire for information on outages and their impacts from market participants.

3.6.2 Corporate Emergency Response and Security

Corporate Emergency Response

With respect to Corporate Emergency Response, Powerlink Queensland is committed to:

- in order of priority: human life, safety and welfare, environment, property, security of supply, responsible corporate governance
- open communication with all stakeholders, including the public and the media
- ensuring contingency and emergency management plans exist for all of the key elements of the Corporation's risk profile, with plans being regularly reviewed and updated
- ensuring the physical and emotional welfare of staff and their relatives in emergency situations
- providing regular training, exercises and reviews.

In achieving these objectives, Powerlink has developed the **Corporate Emergency Management Handbook (CEMH)**, which explains Powerlink's emergency response procedures for different levels of incidents, as applied to different types of plant, equipment and systems. Emergency management plans exist for the transmission network; business continuity; state disaster/emergency; environmental/cultural heritage emergency; workplace safety; and terrorist/criminal acts.

Each of the different emergency management plans involve five levels of corporate emergency, ranging from a standard event that can be handled by Powerlink using existing resources, to a major jurisdictional event managed by external emergency authorities where Powerlink manages its own network response in co-ordination with the greater response.

Roles and accountabilities for Powerlink staff vary depending on the significance of the emergency. The CEMH sets in place procedures for emergency response and event escalation where appropriate, and defines accountabilities and roles for each type of emergency condition. Powerlink's corporate emergency escalation framework is matched with AEMO's arrangements.

Corporate Emergency Response strategies also take account of network disaster recovery facilities, coordination of major system event investigations and liability management frameworks.

Security

The **Policy for Managing Security** outlines the way in which Powerlink will manage its obligations as an owner of National Critical Infrastructure and is intended to progressively improve the security of transmission infrastructure to:

- ensure the safety of the public and our employees
- protect our business against acts of terrorism
- mitigate the potential for attacks on Powerlink's property and information technology facilities

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- protect confidential data within a secure framework
- ensure business continuity.

Powerlink is also committed to the following objectives:

- Identification of vulnerabilities.
- Risk mitigation strategies.
- Deterrence.
- Detection.
- Response.
- Corporate communications in the event of a security breach.

A corporate model for security has been implemented that places focus on the following two primary security aspects:

- Physical Security – denoting the physical measures applied to buildings, control centres, communications facilities and transmission infrastructure (transmission lines and substations).
- Cyber Security – applies to security implemented in digital technology areas to prevent unwarranted external or internal access (firewalls, intrusion detection, and secure access gateways) and the dissemination of viruses. Also applies to the secure administration of data, with respect to access privileges, documentation classification frameworks, and user profiles.

3.6.3 Maintenance and Refurbishment

Powerlink has a responsibility to provide effective and efficient transmission services to customers and other NEM participants. To do this Powerlink needs to ensure network assets deliver the required reliability, availability and quality of supply while doing so at minimum life cycle cost. The maintenance and refurbishment arrangements are critical elements of achieving these outcomes.

The overall Asset Management system must therefore, effectively coordinate and integrate the high level design and selection of equipment with the ongoing requirements for asset monitoring, maintenance & refurbishment. Selection and configuration of plant making up assets must focus on maintainability, supportability and compliance as well as consideration of life cycle factors. In addition to providing for optimal design, maintenance and operating procedures, the selection process needs to coordinate with the capability and availability of resources.

In line with the **Asset Maintenance Policy**, Powerlink has adopted Reliability Centred Maintenance (RCM) analysis of plant maintenance requirements which provides a framework for logically analysing the potential failure modes of plant, equipment and systems, as well as their likely effects and consequences. This analysis is used to review and update the responsibilities for, and frequency of, maintenance activities, including the levels of spares to be carried and any training required so as to maximise plant reliability and availability whilst optimising ongoing maintenance costs.

Key to this model is the systematic investigation of:

- what functions and performance standards the asset must meet
- the possible causes of failure
- the consequences of any failure(s)
- the formulation of actions to ensure the asset continues to do what it is designed to do..

Correct application of the RCM approach will yield:

- detailed maintenance schedules for each major item of plant and part thereof
- revised operating procedures

ASSET MANAGEMENT STRATEGY

- design corrections to address those situations where the asset cannot deliver the desired performance in its current configuration.

Central to the application of the RCM model is the timely collection of information on the condition and performance of the asset.

Powerlink classifies maintenance as shown and described below.

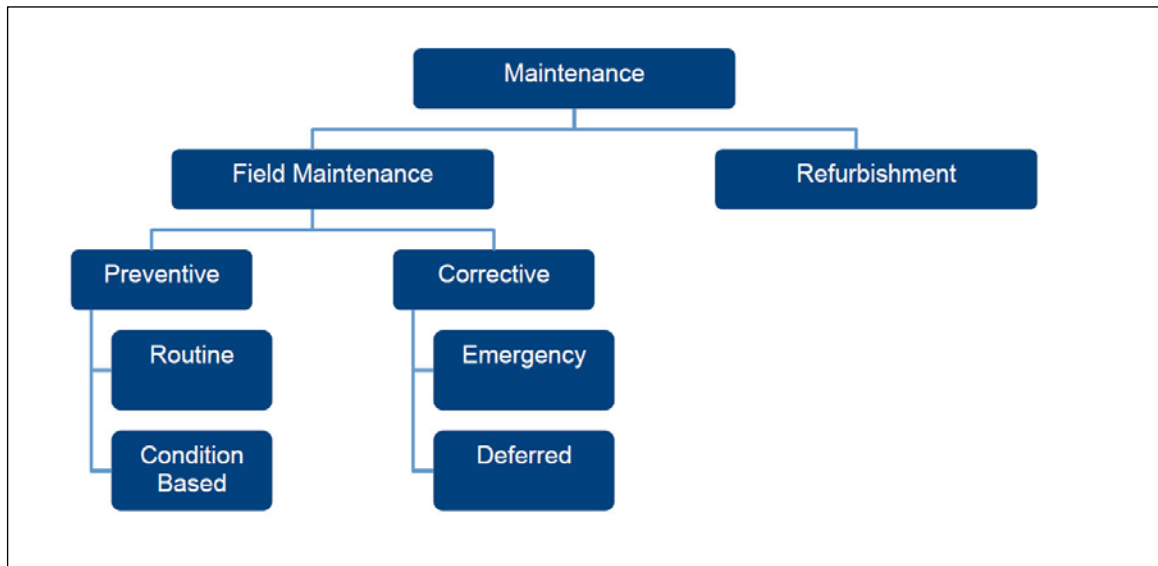


Figure 3 Types of Maintenance

Preventive and Corrective Maintenance

Preventive Routine maintenance is undertaken when hidden failures exist in plant or equipment that must be addressed through various forms of routine activity – although this activity can be sometimes performed remotely by leveraging off Powerlink’s innovations in remote interrogation.

Preventive Condition Based maintenance usually evolves out of routine maintenance or inspection, where a technician notes that an item of plant or equipment is operating out of tolerance and requires attention at some point in the future.

Corrective Emergency maintenance can occur at any time, and involves faults that must be attended to immediately to preserve human safety, manage environmental issues or return plant to service to reduce the impacts of network outages on our customers.

Corrective Deferred maintenance involves faults on plant and equipment that are not urgent and can be prioritised and aligned with other work in the future to optimise maintenance costs and effort.

Powerlink’s integrated asset management system SAP allows for the recording of:

- routine field maintenance schedules
- notifications relating to condition based and corrective activities
- any faults and their likely cause
- restoration works required
- costs.

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This integrated approach ensures Powerlink can:

- develop profiles of its plant items with respect to quantity, type, age and maintenance costs
- designate assets as regulated or non regulated
- maintain a central repository for plant history (routine works, defect reporting, work orders)
- optimise maintenance strategies by having a close linkage between maintenance plans, reporting and the financial management systems.

Insurance Spares

Powerlink holds network insurance spares in order to provide the level of network and plant availability to comply with the Rules. Insurance spares enable critical system elements to be returned to service without excessive delays restoring the network to its former condition and reducing the risk of interruption to supply. The significant lead times to obtain replacement items of major primary plant can be well in excess of 12 months. Operating the network without critical elements for extended periods of time restricts maintenance access and leads to unacceptable level of probability of loss of supply in the event of further failures.

Powerlink will hold network spares as appropriate as a form of insurance so as to ensure the required level of system and plant availability as well as reliability standards laid out by the National Electricity Rules are met. The numbers of spares are determined such that the network can be returned to service in line with existing reliability standards while not compromising the remaining network until the appropriate replacements can be sourced.

Refurbishment

Assets within the transmission network may need to be refurbished in order to maintain the capability of an asset for the provision of network services, and is governed by the **Asset Refurbishment Policy**. Refurbishment can be triggered by a range of factors and is typically considered when the cost and effort to maintain the plant or equipment is more than normal maintenance expenditure, or when a systematic problem in need of repair has been identified. Refurbishment is considered an expense to the business, and is different from Powerlink's definition of asset replacement.

Asset refurbishment involves activities that return an asset to its pre-existing condition or function, or activities undertaken on part of an asset to return that specific component to its pre-existing condition or function. In contrast, asset replacement is an activity that involves the complete replacement of a financial asset to achieve an improvement or increase in the capacity, capability or compliance of the pre-existing asset or involves extending the life of the asset beyond the financial life it would otherwise have. Asset replacement is undertaken via a capital project.

Refurbishment plans are developed on an ongoing basis and budgeted for annually. Base data for the refurbishment program is derived from plant condition assessments, maintenance service provider feedback and the root cause analysis of plant and equipment failures.

Asset Monitoring

Powerlink has adopted a range of technologies that allow it to remotely monitor its assets for the purposes of fault and configuration management as well as condition/performance monitoring.

The use of remote monitoring technologies for fault management helps improve response times and decrease the impact of forced outages, while remote condition and performance monitoring can reduce the need for intrusive local maintenance activities and provide direct performance feedback that can be used to modify or refine scheduled maintenance activities.

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Tracking settings applied to the high voltage transmission network, and those software configurations applied to digital technologies, also ensures Powerlink has consistent data available for the restoration of the network in the event of plant or equipment failures.

3.7 End of Life

The end of life phase of the asset involves considering an asset's ongoing fitness for purpose and whether an asset should be disposed of or replaced. Any replacement decision needs to also consider the requirements associated with planning and investment to ensure optimal economic outcomes.

- Asset replacement, life extension or disposal
- Maintain plant capacity
 - Maintain plant capability (reliable, maintainable, and supportable)
 - Ensure compliance (security, environment and safety)
 - Consider current and future network needs

3.7.1 Non Load Driven Asset Replacement

Non-load driven network projects are predominantly associated with the replacement of assets to maintain the capacity or capability of the transmission network or to ensure security of our infrastructure or compliance with legislation and statutes. Unlike load-driven projects, investment decisions in this environment are taken against risk management frameworks, to optimise the timing and type of replacement against the risks of the asset remaining in service.

Asset replacement, governed by Powerlink's **Asset Replacement Policy** makes up most of the projects that are not driven by load growth. Powerlink considers that the age of an asset does not provide for automatic justification of its replacement, but is a trigger for condition assessment or other analysis that then determines whether the asset requires replacement due to issues with capacity, capability or compliance. The terms capacity, capability and compliance are used to broadly describe a number of specific issues that may lead to asset replacement action, such as poor performance, new standards, rising fault levels and obsolescence.

For Powerlink, capacity (as related to a specific asset) is a term that considers the ability of an asset to handle the load placed on it by operational service, while asset capability gives consideration to the condition, performance, availability, reliability and supportability of assets.

Risk assessments are carried out for asset replacement projects that focus on the likelihood of failure (including assessment of dominant failure modes; characteristic age and shape factor for the dominant failure mode and failure rates) and the consequence of failure.

Where possible, asset replacement requirements are to be integrated into the load-driven capital works program. In this way, Powerlink can capitalise on opportunities to coordinate a range of similar projects (through work type, geographical location or timing) to achieve economies of scale and optimised delivery.

Risk Assessment

Risk assessment plays a significant role in the management of Powerlink assets. It provides the means for understanding the potential cause, effect and likelihood of adverse events, as well as the mechanism for managing such risks to acceptable levels.

Powerlink's process of risk management from an asset management perspective involves:

- identifying the potential risks (including possible failures and consequence of failures) associated with the network's critical assets

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- determining the most suitable asset management activity to control the risk(s). Although primarily undertaken towards the end of an assets technical life, such risk assessments are considered all through the life of the asset and the asset management activities resulting will vary depending on the outcomes of the assessment. Activities could include maintenance, refurbishment or asset replacement
- prioritising the allocation of resources to any identified activities based on timing and level of risk(s).

Each asset group uses a risk assessment framework in line with AS/NZS ISO31000:2009 Risk Management and the Powerlink Risk Charter.

To assess risk Powerlink undertakes a periodic review of the network assets to assess a range of factors influencing the capacity, capability or compliance of the asset, including, but not limited to:

- physical condition
- capacity constraints
- fault levels
- spares levels
- performance and functionality
- reliability and availability
- accuracy and resolution
- training and supplier support
- maintenance history and costs
- outage performance
- statutory compliance

3.7.2 Disposal

Asset disposal is considered where the asset is deemed to be not required in the current and future network topology in conjunction with factors including significant performance or reliability deterioration and/or significant ongoing costs for maintenance and refurbishment.

4 RESOURCE ALIGNMENT

4.1 Resource Planning

It is important that resources are made available to achieve the strategies which are to be implemented and that the resource needs are taken into account in the development of the Asset Management strategies.

Powerlink uses a range of tools to develop resource plans over different forward planning horizons.

In the medium to long term, scenario based analysis is used to develop capital forecasts that provide macro level indications of longer term future asset investment requirements. This high level forecast is factored into analysis that forecasts the combination of capital and operational project workload, and further modelling is used to devise forecasts for operations and maintenance workload and expenditure.

In the shorter term, when Powerlink develops more confidence in the future requirements for load driven network projects (network augmentation, customer connections and easements) and non-load driven network projects (capital replacements, etc), an integrated *capital works* plan is developed that provides a short term indication of future project workload.

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Operational expenditure in the short term is based on an annual budgeting cycle, which includes the delivery of maintenance plans and activities, operational support and anticipated expenditure on the refurbishment program.

4.2 Implementation Strategies

Powerlink has adopted implementation strategies across its portfolio of projects and activities aimed at efficiently delivering the overall work program. Powerlink recognises that skilled resources are valuable and will be in short demand as the resource sector recovers from the global financial crisis. Implementation strategies therefore continue to take into account management of resource requirements, particularly human resource requirements. The following strategies continue to be adopted:

- Design standardisation – using standard designs for major elements of substations and transmission lines to minimise the amount of customisation required and take advantage of economies of scale.
- Program management – grouping of projects into bundles of work that can be awarded to major contractors to allow them to plan ahead with certainty and secure their own resources.
- Supply chain management – ordering materials in advance to allow for manufacturing windows. As this is combined with increased use of standard designs and equipment the risks associated with ordering of equipment is eliminated as it can readily be redeployed if necessary.
- Streamlined easement and land acquisition – earlier identification of easement requirements to help ensure access can be provided at the time required by the contractor as the requirements of the processes to achieve planning approvals continue to extend.
- Outsourcing – outsourced companies can utilise already established standard designs and maintain Powerlink standards and consistency of plant type and installation.
- Maintaining internal staff – Powerlink continues to perform well as an employer of choice and seeks to maintain that position.

4.3 Cost and Resource Management

Powerlink is targeting the efficient implementation of work associated with network operation, field maintenance, refurbishment and project delivery. Wherever practical, performance based agreements are used for managing the relationship between Powerlink and its internal and external service providers.

Operational expenditure budgets are developed that reflect the planned and expected work in the categories of field maintenance, refurbishment projects, maintenance support and network operation. These budgets are subject to review to ensure expenditure is within targets and that the work is being conducted in a manner that maintains the reliability and security of the transmission network.

A key component of controlling costs and achieving efficiencies involves the forecasting and management of the routine maintenance workload and refurbishment projects, in conjunction with the ongoing management of non-routine maintenance and Powerlink's capital project program for the full range of network projects.

Powerlink also continues to pursue innovative work techniques that optimise maintenance or operating costs, reduce risk to personal safety, reduce the requirement for planned outages on the network or allow the organisation to respond faster in restoring the network after faults.

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A range of initiatives have been put in place to achieve these outcomes, including:

- Asset Monitoring – established by leveraging off Powerlink’s deployment of advanced digital technologies and high capacity telecommunications, the Asset Monitoring Team provides centralised fault management, configuration management and plant condition monitoring.
- Live line and substation work – Powerlink has pioneered the introduction of live line and substation work in Australia, and it has become an intrinsic part of Powerlink’s strategies for reducing the impact of planned outages on NEM participants.
- Contracted maintenance service provision – outsourcing a large part of maintenance throughout the state has assisted in achieving cost effectiveness in delivering maintenance activities through synergies of local involvement or provision of specialised services from suppliers dedicated to that work type. Powerlink has established relationships with a number of service providers, including Ergon (ground based) and Aeropower (aerial), who contribute to the effective maintenance of Powerlink’s assets.

Powerlink’s management of field activities includes an audit provision that allows it to ensure compliance with:

- performance or delivery requirements
- Powerlink policies or procedures
- the Service Provider’s own internal policies or procedures
- recognised standards of work, including safety and environmental requirements applicable to the area of work.

Powerlink undertakes regular auditing of maintenance service providers against technical and process based performance indicators, and also audits service providers for compliance with safety and environmental requirements. Auditing policies, procedures and checklists are maintained to support each of the auditing functions.

The outcome from these audits in conjunction with plant performance information also allows Powerlink to assess the outcomes of its overall maintenance and refurbishment strategies against the desired outcomes. This facilitates the continuous improvement part of the overall Asset Management Cycle.

Powerlink’s financial systems are structured so that costs are allocated to financial assets based on the plant item being worked on. As all plant is associated with assets, which are assigned a regulated, negotiated or non-regulated status, the costs associated with the plant are automatically aggregated to the appropriate cost center. In this way, Powerlink can apply the same strategies to managing its assets and costs will be allocated appropriately irrespective of whether prescribed or non-prescribed transmission services are being provided.

5 CONTINUOUS REVIEW

5.1 System Performance

Powerlink undertakes a range of routine system performance reporting activities, with particular focus on compliance with:

- National Electricity Rules
- AEMO Power Systems Data Communication Standard
- AER Service Target Performance Incentive Scheme

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- AER Market Impact of Transmission Congestion.

In order to support advanced system performance monitoring, Powerlink has developed the following range of tools for the collection and analysis of performance data.

- Integrated asset management system (SAP) – providing data on routine maintenance progress, defect reporting and plant history, enabling the development of broad trending in plant and equipment performance.
- Forced outage database (FOD) – database developed to provide details of forced outages on the network, including nature of outage, restoration timeframes and an appraisal of the root cause of the outage.
- OSI-PI & ACMS – data-mining applications that provide automatic analysis (reliability, availability and equipment performance statistics) of real-time SCADA information and near-real time OpsWAN data.
- Energy Management System (EMS) – provides real-time monitoring of the high voltage network in a 24x7 control centre environment. The EMS also includes a range of applications designed to provide decision support in the operation of the HV network, including network utilisation forecasting and constraint analysis.
- Operational Wide Area Network (OpsWAN) – provides a wide area network connection between intelligent digital devices that monitor, control and protect the HV transmission network. This level of interrogation underpins the remote asset monitoring strategy and is used to accelerate fault management and undertake remote condition monitoring of our assets.

The specific application of these tools to the measurement of performance and condition across the network's assets is outlined in the Asset Methodologies.

5.2 Business Performance

5.2.1 Capital Investment

The performance of Powerlink's capital investments is managed through a range of business processes. In the asset investment phase, Powerlink conducts reviews of the project approval and selection process to ensure the planning and approval is carried out thoroughly and efficiently, including any consultation processes required under the National Electricity Rules and for application of the Regulatory Investment Test - Transmission.

Throughout the implementation phase of the project, the Asset Management function retains project sponsorship responsibilities, including budget approval, variation control and the provision of direction on the technical outcomes of the project. This level of accountability ensures that project implementation is achieving the right outcomes at a cost that is still considered efficient to the organisation.

5.2.2 Controllable Operating Costs

Management of controllable operating costs is achieved through annual budgeting, and ongoing review (monthly, quarterly and annual) of planned operational expenditure against actuals.

Each of Powerlink's contractual relationships with service providers is focused on managing performance via key performance indicators relating to timely delivery of work, cost-efficiency and quality outcomes. The outcomes of these Service Level Agreements are geared to the careful management of service provider costs, whilst ensuring that work is undertaken in a timeframe that ensures reliability and quality of supply and in a manner that achieves quality outcomes.

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In terms of Powerlink's efficiency in the maintenance and operation of the transmission network, international benchmarking exercises are also undertaken through Powerlink's involvement in the *International Transmission Operations & Maintenance Studies (ITOMS)*. These have indicated Powerlink has maintained a position within the best performing quartile for a number of years and is a leading TNSP with respect to operating cost efficiency and asset performance. Powerlink continues to engage in this benchmarking exercise as a useful framework for analysing its maintenance and operations performance and for learning from other international utilities.

5.3 Documentation

As part of Powerlink's asset management process there is a requirement to maintain and communicate information in a systematic way in order to ensure that the broader organisation can understand and operate in accordance with the Asset Management Policy and Strategy.

To support this outcome, Powerlink has established a hierarchical documentation framework, known collectively as Asset Management (AM) documents, consisting of strategies, policies, procedures and checklists that are managed within corporate document management system, Objective. Procedures are in place for controlling, revising, approving and transmitting these documents to relevant stakeholders.

Each asset group expresses the specific information related to its assets through AM Documents, which are reviewed on a periodic basis.

5.4 Consultation & Communication

Powerlink's asset management process is inherently collaborative and at each stage in the asset lifecycle, consultation and communication is undertaken through a range of processes and forums.

In order to monitor and improve maintenance effectiveness and efficiency through the Operation, Maintenance and Refurbishment phase of the asset, issues affecting plant and network performance, plant reliability, maintenance effectiveness and work programming are discussed regularly at the following forums:

- Network Maintenance Forum
- Maintenance Co-ordination Meetings

The Network Maintenance Forum involves representatives from Engineering, Network Operations, Maintenance Service Providers' Management and Asset Management. All events that have occurred on the system are reviewed along with any other issues that may affect asset performance (capital program, maintenance progress etc).

Maintenance Co-ordination Meetings are held quarterly to discuss maintenance and design policy, and obtain quality feedback from the field maintenance experience.